# NIGHT STOCKER
# FIELD CONVERSION KIT
## INSTRUCTION SHEETS

PART NO. AE74-00301-0000

Bally SENTE™

10601 W Belmont Avenue
Franklin Park, Illinois 60131
U.S.A.

Phone (312)451-9200 Cable Address MIDCO Telex No. 72-1596

M051-00E74-A016

## WARNING

**THIS GAME MUST BE GROUNDED. FAILURE TO DO SO MAY RESULT IN DESTRUCTION TO ELECTRONIC COMPONENTS.**

**WARNING:** This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a CLASS A computing device pursuant to SUBPART J of PART 15 of FCC RULES, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

ELECTRICAL BULLETIN: FOR ALL APPARATUS COVERED BY THE CANADIAN STANDARDS ASSOCIATION (CSA) STANDARD C22.2 NO. 1, WHICH EMPLOYS A SUPPLY CORD TERMINATED WITH A POLARIZED 2-PRONG ATTACHMENT PLUG.

CAUTION: TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

ATTENTION: POUR PREVENIR CHOCS ELECTRIQUES NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR. UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

Bally SENTE™

*Invites You To Use*

**OUR TOLL FREE NUMBERS FOR SERVICE INFORMATION CONCERNING THIS GAME, OR ANY OTHER BALLY/SENTE™ GAME YOU NOW HAVE ON LOCATION.**

**CALL US FOR PROMPT, COURTEOUS ANSWERS TO YOUR PROBLEMS.**

**Video - Continental U.S. 800-323-7182**

Bally SENTE™ 10601 West Belmont Avenue Franklin Park, Illinois, 60131 phone (312) 451-9200



Printed in U.S.A

M051-00139-A004

## WARNING

The parts contained in this field conversion kit must be installed without deviation from the instructions contained in this manual and kit. Failure to follow these instructions in every detail may result in the creation of illegal interference to radio and TV reception.

BALLY SENTE has verified that this field conversion kit, when installed in the game cabinets: SAC 1A, SAC 1B, SAC-MAN conversion (E23) or SAC-MAN conversion (E48), as specified in this manual, complies with the requirements in Part 15 of the FCC rules for a Class A computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception, requiring the operator to take whatever steps are necessary to correct the interference.

BALLY SENTE will not be responsible for incomplete or improper conversions, or installation in a game for which this field conversion kit is not intended. If this conversion kit is installed in a game that is not specified in this manual or in a previously converted game, the operator is required to take whatever steps are necessary to insure compliance with the requirements in Part 15, Subpart J, of the FCC Rules for a Class A computing device.

**NOTE:** SAC 1A consists of SAC electronics in a wooden cabinet with a large metal front access door.

SAC 1B consists of SAC electronics in a wooden cabinet with a large wooden front access door.

SAC-MAN (E23) is a BALLY SENTE cabinet conversion kit to convert a PAC-MAN, MS. PAC-MAN, or GALAXIAN game cabinet.

SAC-MAN (E48) is a BALLY SENTE cabinet conversion kit to convert a TRACK & FIELD or HYPER SPORT game cabinet.

**W A R N I N G ! ! !**

**DO NOT** INSTALL THE NIGHT STOCKER GAME KIT (PART #GE74-00001-0000) IN ANY SAC 1 (TUBULAR METAL FRAME) CABINET **WITHOUT** ALSO INSTALLING THE SAC 1 UPDATED FIELD KIT (PART #GE90-00001-0000).

THE SAC 1 UPDATED FIELD KIT CONTAINS A FULLY TEMPERED FLOAT GLASS (U.L. RECOGNIZED) WHICH **MUST** REPLACE THE EXISTING VIEWING GLASS IN YOUR SAC-1 CABINET.

**! ! I M P O R T A N T ! !**

MONITOR AND FACE GLASS **MUST** BE CLEANED FOR GUN TO OPERATE PROPERLY ! !

REGULAR CLEANING WILL HELP INSURE PROPER OPERATION.

**! ! I M P O R T A N T ! !**

# Night Stocker Game Review

Night Stocker is a one-player first person driving/shooting game. Controls consist of a steering wheel and a hand-held gun secured to the game cabinet on a cable.

## Game Description

You find yourself driving the armored car, known as Night Stocker, on an unknown planet. The goal is to capture energy and shot crystals and to destroy the robot force defending the planet.

In the first scene, you are driving at high speed across an alien landscape. You must dodge mines, hazards, and other dangerous obstacles while attempting to reach the next robot installation. You are constantly under attack by a variety of airborne and land-based robot ships and weapons. You can defend yourself by shooting the enemies and their armament with your hand-held gun.

Your gun operates in either single-shot or "UZI" machine gun mode and has vast destructive power. You must, however, conserve your shots and energy shields by capturing colored crystals in the electrical claw mounted on the front of your car.

If you are able to reach the outpost, your car slows to a stop in front of the robot installation. Your job here is to clean out the enemy outpost before they destroy you.

Each of the 16 waves in the game contain unique enemies with a variety of weaponry and each outpost increases in size, complexity, and deadliness as indicated in the following "Night Stocker Enemy Chart". The game also has 2 levels of switch-selectable difficulty with the"Easy" setting being the recommended initial setting.

## Attract Mode

When the game is first powered or when self-test is exited, a blank screen with message "Loading" appears for approximately 30 seconds. This is to allow for the sound circuitry to be initialized.

Subsequently, the Title screen followed by the High Score screen will appear. If music in attract has been selected (the recommended default) it will start with the next screen, the Demo screen.

Other screens include the Credits screen and the Enemies screen. Note that the Demo screen and the Enemies screen will explain the scoring possibilities as well as the methods used to capture crystals, recharge shields, and gather more shots.

# NIGHT STOCKER ENEMY LIST

| ENEMY NAME | WEAPONRY | WAVE NUMBER | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| IDORS | PINCERS | X | | | | | | | | | | | | X | | | X |
| MARK III's | MINES | | X | | | | | X | | | | | | | | | |
| MARK VII's | BOUNCERS | | | | | X | | | X | | | | | X | | | X |
| SPEEDERS | BULLETS | | | | X | | X | | | | | X | | | | | X |
| DYADS | BUZZ SAW | | | | X | | | | X | | | | | | | X | |
| NUKES | BOMB | | | | | | | X | | | X | X | | | X | X | X |
| ZARKS | SMARTS | | | | | | | | | | | | X | | X | X | X |
| DROSIANS | MINES | | | X | | X | | | | X | | | | | | | X |
| CRUISERS | BOMB | | | X | | | | | X | | X | X | | X | | X | X |
| GAZERS | DEATH RAYS | | | | | | X | | | X | X | | | X | X | X | X |
| ROBOTS/ OUTPOST | BULLETS | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 23 | 25 |
| SIMULTANEOUS ROBOTS/WAVE | BULLETS | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 4 | 5 |

NOTES: 1. An X indicates that enemy may be activated in this wave.
2. Sentry-class Robots man the robot outposts.
3. Hard difficulty mode adds 10 robots/outpost.
4. Speed of enemies increases with each wave.

## Self-Test

Pressing the self-test switch on the chassis will cause the game to enter a sequenced self-test mode. First the RAM (Random Access Memory), the ROM (Read Only Memory) checksums, and the sound circuitry are tested. Messages indicating the status of this hardware will appear at this point. Pressing the gun trigger will advance to the next portion of the test.

The next two screens in self-test are to help with the set-up and alignment of the gun. First a grey scale appears to help adjust the monitor's contrast and to help achieve a full range of black to white. Next a full white screen appears with a small digital readout indicating the gun's co-ordinates appearing in the upper left corner. Aiming the gun at the screen will cause small blue dots to appear on the screen wherever the gun is pointing. This will allow you to see if the gun is reading over the full surface of the screen. If the gun does not appear to fully reach the sides or the corners of the display it means that the monitor and the protective ground-glass need to be cleaned thoroughly. It is VERY IMPORTANT! to keep the glass and the monitor clean for proper operation of the gun.

If the gun still does not work after cleaning the monitor and both sides of cabinet glass, check to see that the gun barrel is free of obstructions and that the gun lens is clean. If necessary, carefully wipe the lens with a soft clean damp cloth to remove dirt.

The next screen will readout the status of the switches and analog state of the steering wheel inputs. This allows you to determine if the steering wheel is operating properly or if any of the switches needs repair.

The final two screens are statistics relating to the number of plays and the scores achieved in the game since the last time these numbers were reset in self-test. Note that pressing the Start switch will cause these numbers to be erased and will provide a known starting point for any game stats you wish to collect.

## Gun Interface Board - Theory of Operation

The board contains three sections: a clock generator, an external signal synchronizer, and a position counter/shifter.

The clock generator is self-explanatory. The synchronizer aligns all edges of external signals (HSYNC, VSYNC, OUT 2) with the internal clock.

The position counter/shifter consists of two eight-bit binary counters and two eight-bit shift registers. These are implemented using four PAL16R8 ICS. Each PAL is configured as a four-bit counter, similar to a 74161, and a four-bit shifter, similar to a 7495. The counters are synchronized by HSYNC and VSYNC so as to have the same values as the scan counters on the SAC 1 CPU Board. When the hit detect signal comes in from the gun, the counters freeze. When VSYNC occurs, the information in the counters is transferred to the shift registers for output. The program advances the shift registers with its OUT 2 signal. Four reads are needed to input all 16 bits.

## Gun Opto Board - Theory of Operation

The opto-board consists of a photodiode, a current to voltage converter, an amplifier, and a threshold detector.

Photodiode CR1 produces an output current proportional to the light hitting it. Op-Amp U1 converts this current to a voltage. With the gun a foot from a white screen, the signal on the output of U1 will be in the range of 120-400 mv., depending on the particular photo-diode, monitor brightness and the cleanliness of the optical system. This signal is amplified by Q1 & Q2. The AC component of the output here will be 3-5 volts. Comparator U2 switches whenever Q2's collector goes below 1.3 volts. This output is sent to the gun interface board as a hit.

**NIGHT STOCKER**

OPTION SWITCH SETTINGS - DIP SWITCH "G1"

| //////////////// VARIOUS GAME PLAY OPTIONS //////////////// | SW#1 | SW#2 | SW#3 | SW#4 | SW#5 | SW#6 | SW#7 | SW#8 |
|---|---|---|---|---|---|---|---|---|
| * DIFFICULTY: EASY | OFF | XX | XX | XX | XX | XX | XX | |
| DIFFICULTY: HARD | ON | XX | XX | XX | XX | XX | XX | |
| NO SOUNDS IN ATTRACT | | XX | XX | XX | XX | XX | XX | OFF |
| * SOUNDS IN ATTRACT | | XX | XX | XX | XX | XX | XX | ON |

* INDICATED FACTORY RECOMMENDED SETTINGS — **PART NO. M051-00E74-A007**

**NIGHT STOCKER**

OPTION SWITCH SETTINGS - DIP SWITCH "H1"

| //////////////// COINS PER CREDIT //////////////// | SW#1 | SW#2 | SW#3 | SW#4 | SW#5 | SW#6 | SW#7 | SW#8 |
|---|---|---|---|---|---|---|---|---|
| VARIOUS CREDIT OPTIONS | | | | | | | | |
| FREE PLAY | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF |
| * 1 COIN / 1 CREDIT | ON | ON | | | | | | |
| 1 COIN / 2 CREDITS | OFF | ON | | | | | | |
| 2 COINS / 1 CREDIT | ON | OFF | | | | | | |
| 3 COINS / 1 CREDIT | OFF | OFF | | | | | | |
| **//////////////// COINS ADD BONUS COINS ////////////////** | | | | | | | | |
| * NO BONUS COINS | | | ON | ON | ON | | | |
| 2 COINS ADDS 1 BONUS COIN | | | OFF | ON | ON | | | |
| 3 COINS ADDS 1 BONUS COIN | | | ON | OFF | ON | | | |
| 4 COINS ADDS 1 BONUS COIN | | | OFF | OFF | ON | | | |
| 4 COINS ADDS 2 BONUS COINS | | | ON | ON | OFF | | | |
| 5 COINS ADDS 1 BONUS COIN | | | OFF | ON | OFF | | | |
| 5 COINS ADDS 2 BONUS COINS | | | ON | OFF | OFF | | | |
| 5 COINS ADDS 3 BONUS COINS | | | OFF | OFF | OFF | | | |
| **//////////////// COIN MECH MULTIPLIER ////////////////** | | | | | | | | |
| * LEFT COIN MECH X 1 | | | | | | ON | | |
| LEFT COIN MECH X 2 | | | | | | OFF | | |
| * RIGHT COIN MECH X 1 | | | | | | | ON | ON |
| RIGHT COIN MECH X 4 | | | | | | | OFF | ON |
| RIGHT COIN MECH X 5 | | | | | | | ON | OFF |
| RIGHT COIN MECH X 6 | | | | | | | OFF | OFF |

* INDICATED FACTORY RECOMMENDED SETTINGS — **PART NO. M051-00E74-A007**

**KIT PARTS LIST: NIGHT STOCKER**
**PART NO. GE74-00001-0000**

ORDER BY PART NUMBER **ONLY**

| ITEM | PART NO. | DESCRIPTION |
|---|---|---|
| | AE74-00004-0000 | CONTROL SHELF ASSY. (INCLUDES ITEMS 1 THRU 18) |
| 1 | AB96-00008-0000 | PLATE ASSY.: W/BEARING |
| 2 | AB96-00017-0000 | JUMPER CABLE ASSY. |
| 3 | AC48-00030-0000 | SENSOR DISC ASSY. |
| | AC48-00029-00XF | HUB & PLATE ASSY. |
| | 0C48-00117-0000 | PLATE: TOP |
| | 0C48-00908-0000 | DISC: 64 POS. |
| | 0017-00101-0124 | 6 X 4 UNSLOTTED HEX W/WASHER SCREW (3 REQ'D.) |
| 4 | AE74-00010-00XF | CONTROL SHELF WELD INS ASSY. |
| 5 | AE74-00014-0000 | HAND GUN ASSY. (SEE COMMON ASSY.) |
| 6 | AE74-00016-0000 | STEERING CONTROL CABLE ASSY. |
| 7 | AE74-00017-0000 | STEERING WHEEL ASSY. |
| | AB96-00009-00XF | BASE & SHAFT ASSY. |
| | 0B96-00702-00XF | CAP: SAND CASTING |
| | 0B96-00900-0000 | INLAY: STEERING WHEEL |
| | 0E74-00909-0000 | HUB: SKIRT, STEERING WHEEL |
| | 0017-00009-0604 | STEERING WHEEL: Dia. 12" |
| | 0017-00101-0271 | 1/4 - 20 X 12 HEX SOCKET, SOCKET HD. SCREW (3 REQ'D.) |
| | 0017-00104-0098 | WASHER (3 REQ'D.) |
| 8 | A084-91829-AB96 | ROTATION SENSOR BOARD ASSY. |
| 9 | B006-08004-100A | TRACKBALL PCB ASSY. |
| 10 | B006-08032-010B | GUN-INTERFACE BD. ASSY. |
| 11 | 0B96-00112-0000 | BRACKET: OFFSET P.C. |
| 12 | 0E74-00107-00XF | SHIELD: GUN |

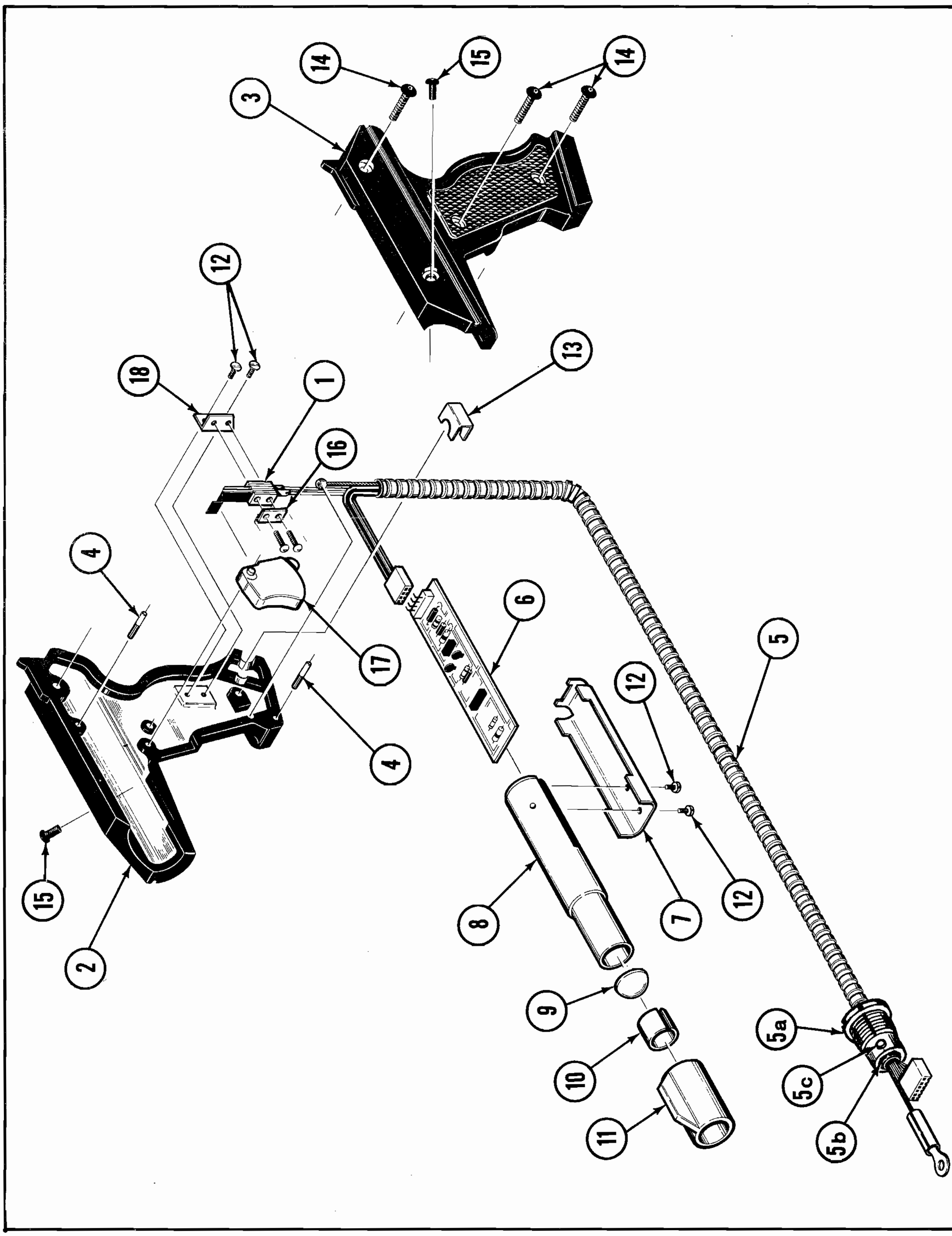
## KIT PARTS LIST: NIGHT STOCKER, CONT.
## PART NO. GE74-00001-0000

ORDER BY PART NUMBER ONLY

| ITEM | PART NO. | DESCRIPTION |
|---|---|---|
| 13 | 0E74-00108-00XF | HOLDER: GUN |
| 14 | 0017-00032-0092 | SWITCH: SPDT P.B. MOMENT LED |
| 15 | 0017-00041-0724 | TUBING: SHRINK 1" BLACK |
| 16 | 0017-00042-0072 | GROMMET: PLASTIC 1/4" (4 REQ'D.) |
| 17 | 0017-00042-0139 | GROMMET: PLASTIC 3/32" (4 REQ'D.) |
| 18 | 0929-00905-00XF | BEZEL: SWITCH |
| 19 | AE74-00018-0000 | SENTE MONITOR ADAPTER CABLE ASSY. |
| 20 | A084-91834-AE74 | PROG. 128K CARTRIDGE: NIGHT STOCKER |
| 21 | AE74-00300-0000 | KIT INSTRUCTION ASSY. |
| | M051-00E74-A007 | TAG: OPTION SWITCH SETTING |
| | AE74-00301-0000 | KIT INSTRUCTION SHEET ASSY. |
| | M051-00C47-A019 | MANUAL: CONVERSION KIT |
| 22 | 0E74-00900-0000 | HEADER: ATTRACT |
| 23 | 0017-00009-0484 | KEY: ALLEN 1/8" TAMPER PROOF |
| 24 | 0017-00042-0310 | CABLE-CLAMP: ADHESIVE KURLY-LOK |
| 25 | 0017-00103-0052 | NUT 6-32 LOCKING (9 REQ'D.) |

# HAND GUN ASSEMBLY

## PART NO. AE74-00014-0000



## HAND GUN ASSEMBLY - PARTS LIST
## PART NO. AE74-00014-0000

ORDER BY PART NUMBER ONLY

| ITEM | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | AA57-00029-0000 | SWITCH ASSY.: TRIGGER |
| | AE74-00011-00XF | GRIP-ASSY.: PAINTED SET (INCLUDES ITEMS 2 THRU 4) |
| 2 | 0E74-00903-0100 | GRIP: RIGHT HAND |
| 3 | 0E74-00903-0200 | GRIP: LEFT HAND |
| 4 | 0307-00700-0000 | PIN: LOCATING (2 REQ'D.) |
| 5 | AE74-00012-0000 | ARMOUR & SECURITY CABLE ASSY. |
| 5a | 0E74-00701-00XF | CABLE TERMINATOR |
| 5b | 0E74-00908-00XF | SLEEVE: ARMORED-CABLE |
| 5c | 0017-00101-0314 | 10-32 X 3 HEX SOCKET CUP POINT SET SCREW |
| | AE74-00013-0000 | BARREL ASSY. (INCLUDES ITEMS 6 THRU 12) |
| 6 | B006-08031-0108 | GUN-OPTO BOARD ASSY. |
| 7 | 0E74-00103-0000 | BRKT.: P.C. BOARD |
| 8 | 0E74-00700-00XF | TUBING: BARREL |
| 9 | 0E74-00902-0000 | LENS: HAND GUN |
| 10 | 0E74-00904-0000 | RETAINER: LENS |
| 11 | 0E74-00905-0000 | TIP: GUN-BARREL |
| 12 | 0017-00101-0547 | 6-32 X 3/16" SLOT. PAN HD. M.S. (4 REQ'D.) |
| 13 | 0E74-00100-0000 | RETAINER: CABLE |
| 14 | 0017-00101-0825 | 10-32 X 12 HEX SOCKET TAMPER RESISTANT BUTTON HD.SCREW (3 REQ'D.) |
| 15 | 0017-00101-0826 | 10-32 X 6 HEX SOCKET TAMPER RESISTANT BUTTON HD. SCREW (2 REQ'D.) |
| 16 | 0020-00243-0000 | PLATE: SPRING |
| 17 | 0307-00908-0000 | TRIGGER: MOLDED |
| 18 | 0E74-00102-0000 | BRKT.: SWITCH |

# BALLY SENTE MONITOR ADAPTER CABLE INSTALLATION NOTICE

The Bally Sente Monitor Adapter Cable, (AE74-00018-0000), as part of the NIGHT STOCKER conversion kit, must be installed in Sente upright mainframe cabinets (SAC 1, SAC 1A, SAC 1B, and SAC MAN) **ONLY.**

Failure to make this installation results in the loss of the Gun Assembly's signal output. This means that the gun's trigger action would have no effect on the screen.

The purpose of this cable installation is to provide VSYNC & HSYNC signal paths from the existing monitor cable (part of master cable assy.) to the GUN INTERFACE P.C. BOARD of the NIGHT STOCKER control panel.

Refer to the wiring diagram (M051-00E74-A005) and also Figure A in this notice. The Monitor Adapter Cable is installed as follows:

A. Power off your unit.

B. Disconnect the 6 pin connector of the existing Monitor Cable (portion of the Master Cable Assembly) from the corresponding connector in the Main P.C. Board of the Video Monitor.
**CAUTION:** THe Main P.C. Board connector may be located close to the monitor picture tube. Carefully remove the Monitor Cable connector, to avoid touching the picture tube with your hand.

C. Connect the Monitor Adapter Cable (supplied in your game kit) as follows:

- Of the 3 cable connectors, two of them are polarized (fastens only one way). Fasten the polarized 6 position connector to the 6 pin connector in the Video Monitor Assembly carefully to avoid touching the picture tube with your hand. Fasten the polarized 3 position connector to the 3 position connector (J21) of the Steering Control Cable Assembly.

- Fasten the non-polarized 6 position connector (with male pins) to the 6 pin connector of the Monitor Cable such that the wire colors blue (position 4), green (position 5) and red (position 6) of each cable corresponds.

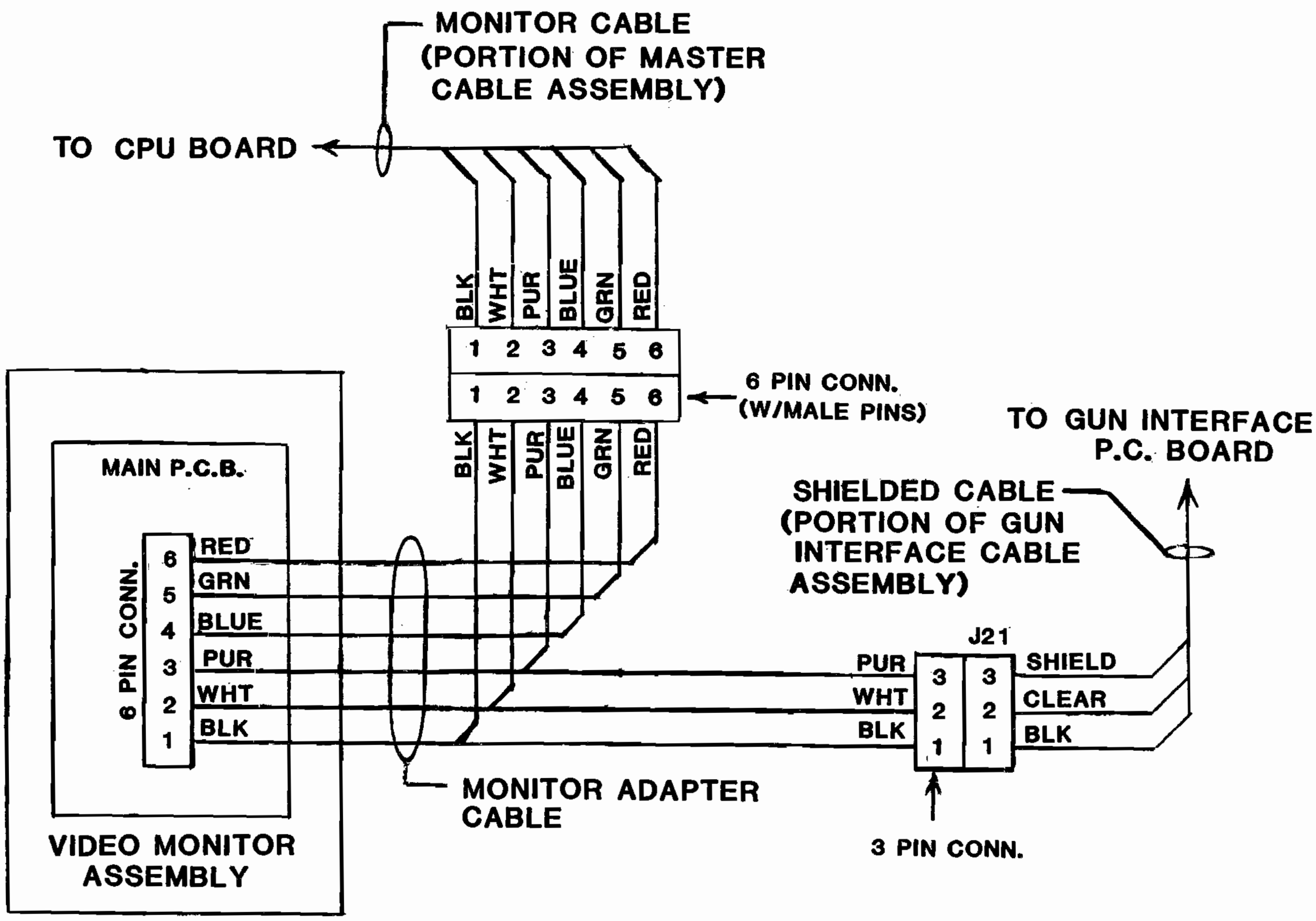
D. Use the plastic "Kurly-lok" cable clamp, provided in your game kit, to position the Monitor Adapter Cable so that it does not rest on anything "electrically hot" in the monitor area.

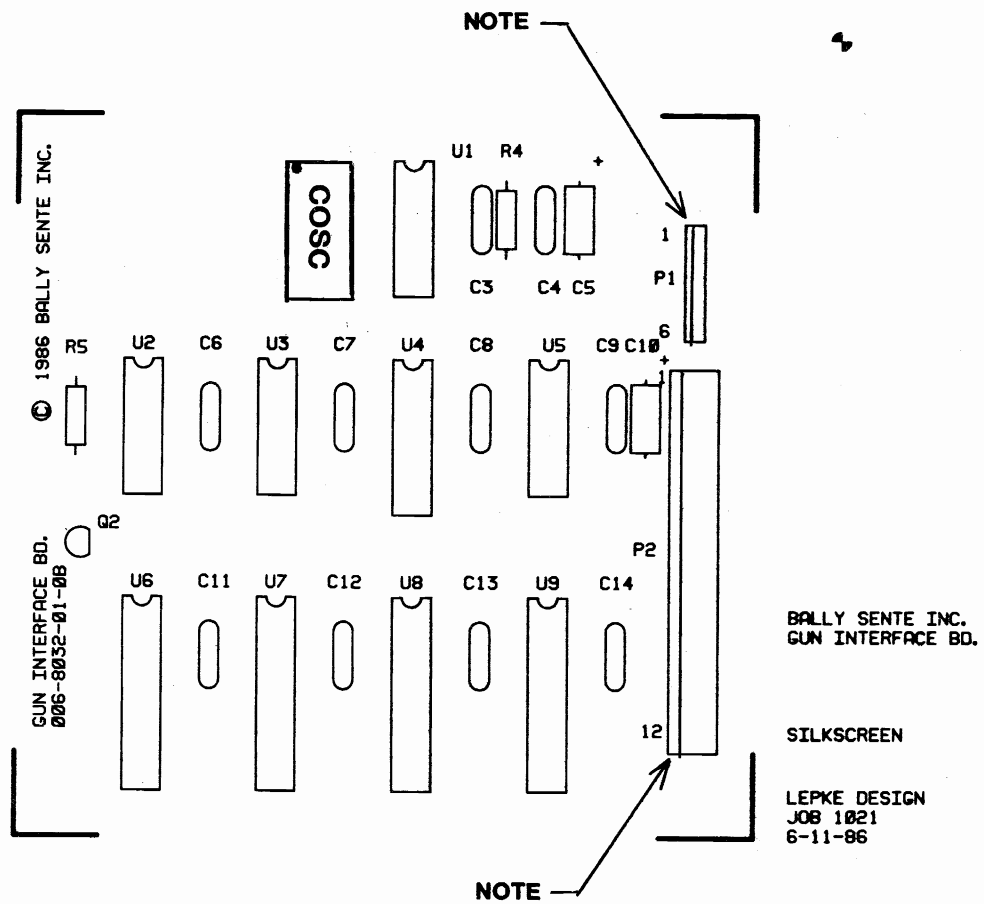
E. Restore power to your unit and check out electrically.

F. Any problems or questions call Bally Sente Service at our toll-free number 1-800-323-7182.

BALLY SENTE MONITOR
ADAPTER CABLE INSTALLATION NOTICE, CONTD.

## FIGURE "A"






NOTE: POLARIZED TABS FACE INSIDE PCB

## PARTS LIST

| DESCRIPTION | QTY. | DESIGNATION | PART NUMBER |
|---|---|---|---|
| 1K OHM 1/4W RESISTOR | 1 | R4 | 100E-00005-0061 |
| 4.7K OHM 1/4W RESISTOR | 1 | R5 | 100E-00005-0079 |
| .1MF CERAMIC CAPACITOR | 10 | C3, C4, C6-C9, C11-C14 | U300-00009-0100 |
| 2.2MF TANT. CAPACITOR | 2 | C5, C10 | U310-00013-0100 |
| 2N3904 TRANSISTOR | 1 | Q2 | 104E-00001-0006 |
| 20.000 MHZ. COSC | 1 | COSC | 0304-00804-0007 |
| 74LS14 I.C. | 1 | U5 | 0A15-00803-0013 |
| 74LS74 I.C. | 2 | U1, U2 | U200-00044-0100 |
| 74LS174 I.C. | 1 | U4 | U200-00053-0100 |
| 74LS260 I.C. | 1 | U3 | 0A28-00803-0020 |
| PAL 16R8 (15-8032-10) | 2 | U6, U8 | U015-08032-1000 |
| PAL 16R8 (15-8032-11) | 2 | U7, U9 | U015-08032-1100 |
| 20 PIN I.C. SOCKET | 4 | U6-U9 | 110E-00001-0005 |
| 6 PIN MT100 CONN. | 1 | P1 | 0017-00021-1794 |
| 12 PIN MT156 CONN. | 1 | P2 | 0017-00021-1795 |
| RAW PCB | 1 | - | U007-08032-010B |
| * FERRITE BEAD | 2 | FB1,FB2 | 0316-00804-0002 |
| * .01MF AX CER CAP | 1 | C15 | 0986-00800-2000 |
| FCC MODIFICATION LIST | - | - | M051-00E74-A021 |

* NOTE: THESE COMPONENTS ARE LOCATED ON SOLDER SIDE OF PCB.

THIS DWG. IS CONFIDENTIAL & PROPERTY OF BALLY/MIDWAY MFG. CO.

| | |
|---|---|
| 9/22 | FERRITE BD. # CORRECTION REV3 J.S. |
| 9/19 | FCC MODS J.S. REV 2 |
| 9/17 | MARKED CONNECTOR TABS J.S. |
| Rel for Production | 7/7/86 J.S. |

REVISIONS

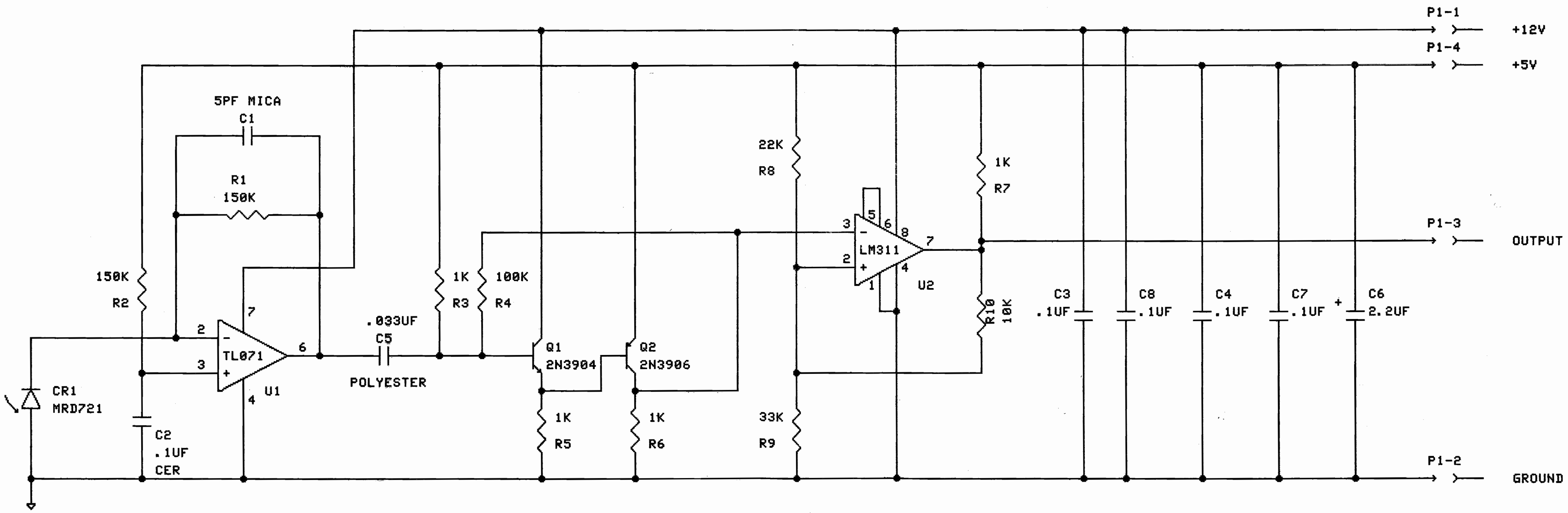
DIM. TOLERANCES UNLESS OTHERWISE SPEC.
CONCENTRICITY T.I.R. . 002
FRACTIONAL ...... ±.1/64
DECIMAL .......... ±.005
HOLE DIA. ..... +.002—.000
ANGLE ............ ±1/2°
DO NOT SCALE DWG.

FIRST USED ON: NIGHT STOCKER
DRN: J.S. DATE: 7-7-86 SCALE: ~
MECH CHK.: ~ MAT'L.: ~
ELEC. CHK: J.S. FINISH: ~

Bally/MIDWAY MFG. CO.
FRANKLIN PARK, IL 60131

ASSEMBLY DRAWING
GUN INTERFACE BD.
U006-08032-010B

PART NO.
M·0·5·1-0·0·E·7·4-A·0·1·0




NOTES:

J. SZERSZEN

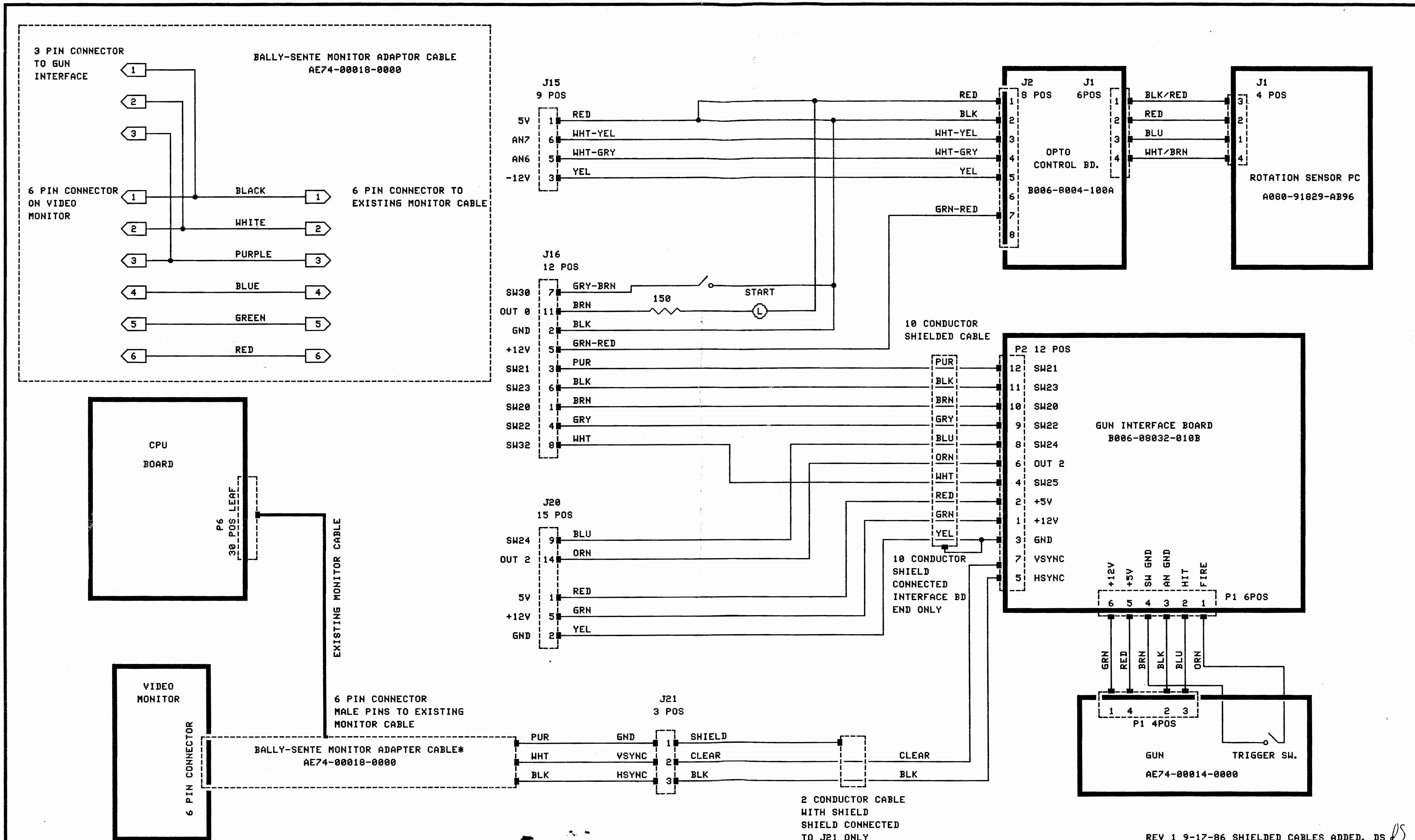
CORRECTED 7-14-86

BALLY MIDWAY MFG. CO.

GUN OPTO BOARD
M051-00E74-A015

SHEET 1 OF 1 REV

14 JUL 86 13:20 /USER/DAN/GUN 2.DRAW

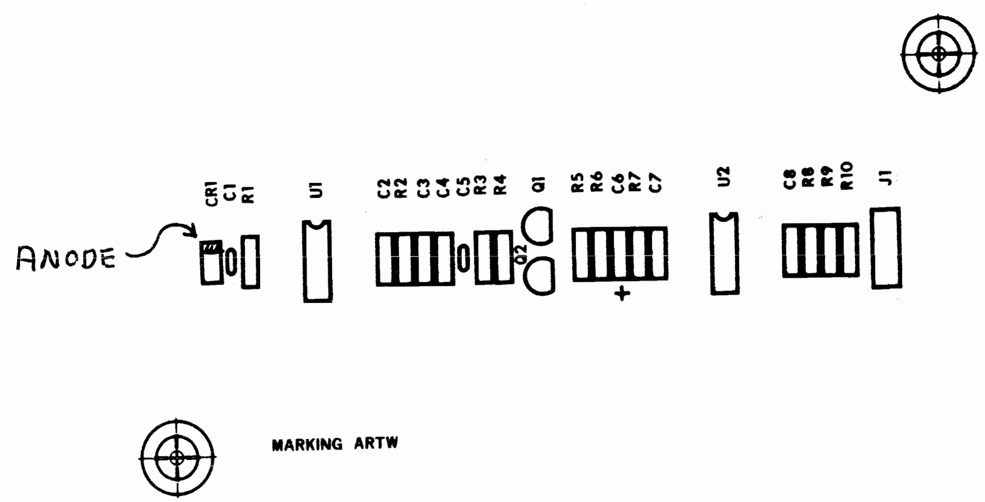



* REFER TO "BALLY-SENTE MONITOR ADAPTOR CABLE INSTALLATION NOTICE".

REV 1 9-17-86 SHIELDED CABLES ADDED. DS

| NOTES: | BALLY MIDWAY MFG. CO. |
|---|---|
| J. SZERSZEN | NIGHT STOCKER CONTROL |
| 9/2/86 | M051-00E74-A005 |
| | SHEET 1 OF 1 REV 1 |

18 SEP 86 14:55 /USER/DAN/GUN/FCC 2.DRAW

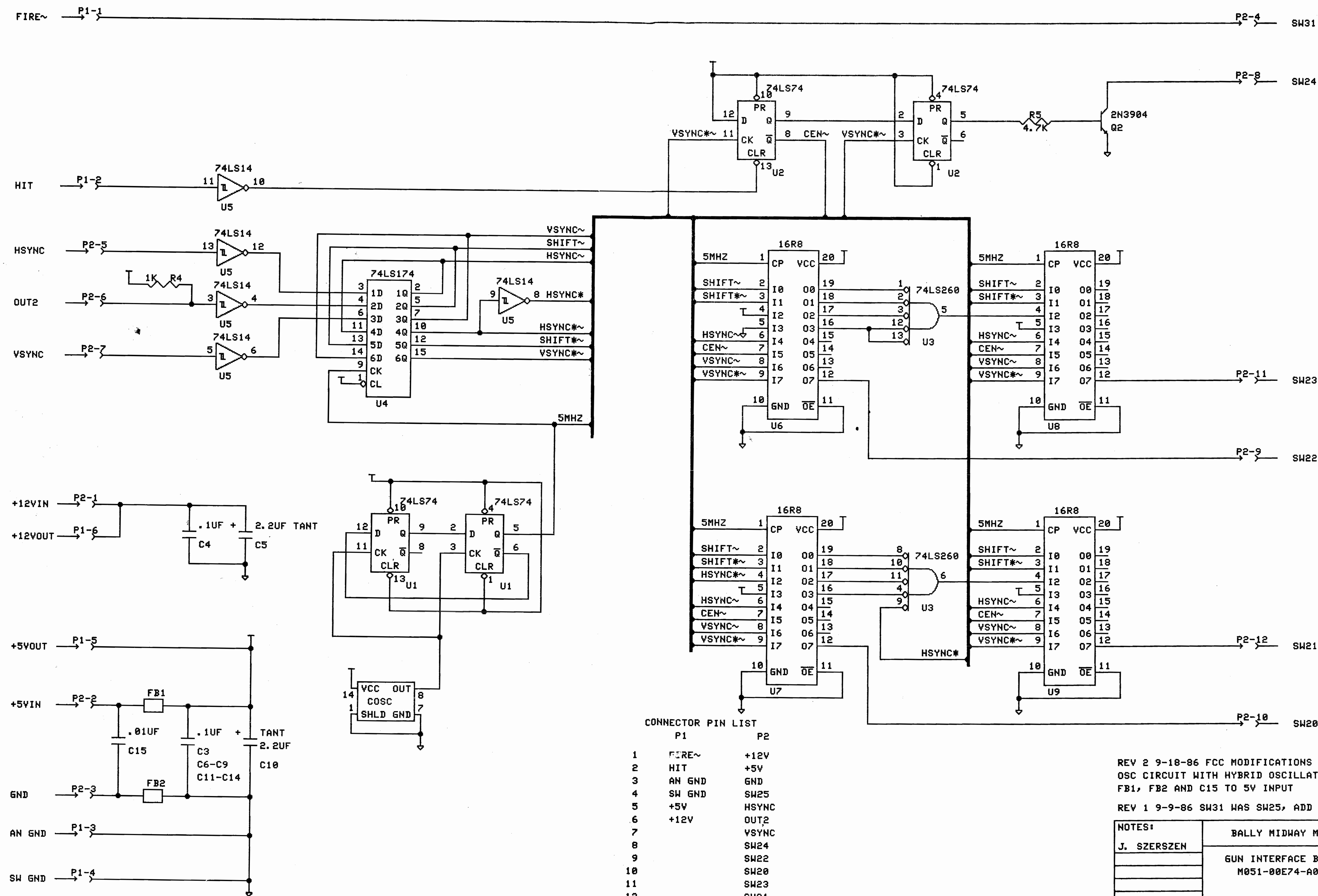



## PARTS LIST

| DESCRIPTION | QTY. | DESIGNATION | PART NUMBER |
|---|---|---|---|
| 1K OHM 1/4W RESISTOR | 4 | R3, R5, R6, R7 | 100E-00005-0061 |
| 10K OHM 1/4W RESISTOR | 1 | R10 | 100E-00005-0088 |
| 22K OHM 1/4W RESISTOR | 1 | R8 | 100E-00005-0096 |
| 33K OHM 1/4W RESISTOR | 1 | R9 | 100E-00005-0100 |
| 100K OHM 1/4W RESISTOR | 1 | R4 | 100E-00005-0116 |
| 150K OHM 1/4W RESISTOR | 2 | R1, R2 | 100E-00005-0120 |
| 5 PF MICA CAPACITOR | 1 | C1 | 0E74-00800-0001 |
| .033MF POLY. CAPACITOR | 1 | C5 | U330-00007-0100 |
| .1MF CER. CAPACITOR | 5 | C2, C3, C4, C7, C8 | U300-00009-0100 |
| 2.2MF TANT. CAPACITOR | 1 | C6 | U310-00013-0100 |
| MRD721 PHOTO DIODE | 1 | CR1 | 119E-00003-0005 |
| 2N3904 TRANSISTOR | 1 | Q1 | 104E-00001-0006 |
| 2N3906 TRANSISTOR | 1 | Q2 | 104E-00002-0003 |
| LM 311 I.C. | 1 | U2 | 0E74-00803-0002 |
| TL 071 I.C. | 1 | U1 | 0E74-00803-0001 |
| 4-PIN RT. ANGLE CONN. | 1 | J1 | 0017-00021-1796 |
| RAW PCB | 1 | - | U007-08031-010C |



| | | | |
|---|---|---|---|
| DIM. TOLERANCES UNLESS OTHERWISE SPEC.<br>CONCENTRICITY T.I.R. . .002<br>FRACTIONAL ...... ±.1/64<br>DECIMAL .......... ±.005<br>HOLE DIA. .... +.002—.000<br>ANGLE ............ ±1/2°<br>DO NOT SCALE DWG. | FIRST USED ON NIGHT STOCKER<br>DRN J.S. DATE 7-7-86 SCALE ~<br>MECH CHK. ~ MAT'L. ~<br>ELEC. CHK. J.S. FINISH ~ | Bally/MIDWAY MFG. CO.<br>FRANKLIN PARK, IL 60131<br>ASSEMBLY DRAWING<br>GUN OPTO BD.<br>U006-08031-010B | B 2/26 ADDED DRWG POL. CR1 + C6<br>Rel For PRODUCTION 7/8/86 J.S.<br>REVISIONS<br>PART NO.<br>M·0·5·1-0·0·E·7·4-A·0·1·3 |




CONNECTOR PIN LIST

| | P1 | P2 |
|---|---|---|
| 1 | FIRE~ | +12V |
| 2 | HIT | +5V |
| 3 | AN GND | GND |
| 4 | SW GND | SW25 |
| 5 | +5V | HSYNC |
| 6 | +12V | OUT2 |
| 7 | | VSYNC |
| 8 | | SW24 |
| 9 | | SW22 |
| 10 | | SW20 |
| 11 | | SW23 |
| 12 | | SW21 |

REV 2 9-18-86 FCC MODIFICATIONS REPLACE OSC CIRCUIT WITH HYBRID OSCILLATOR, ADD FB1, FB2 AND C15 TO 5V INPUT

REV 1 9-9-86 SW31 WAS SW25, ADD P1-5

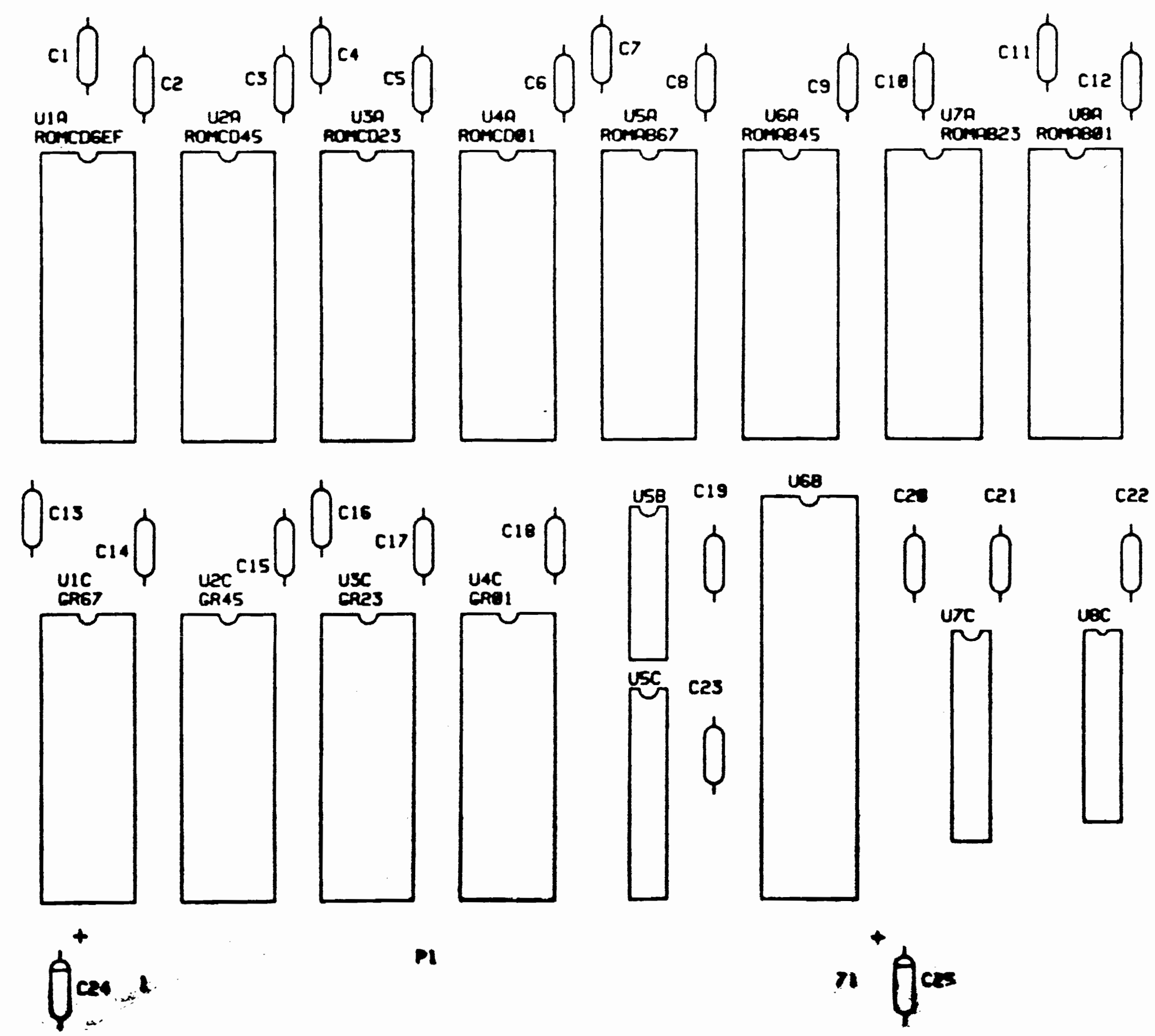
| NOTES: | BALLY MIDWAY MFG. CO. |
|---|---|
| J. SZERSZEN | GUN INTERFACE BOARD M051-00E74-A012 |
| | SHEET 1 OF 1 — REV 2 |

18 SEP 86 14:09 /USER/DAN/GUN/FCC 1.DRAW

UN-PROG CARTRIDGE 128K W/SECURE CHIP
A082-91834-A000
(SENTE BOARD NO. 006-8027-01-0B)

## CROSS REFERENCE LIST

| DESCRIPTION | QTY. | REFERENCE NO. | PART NOS. |
|---|---|---|---|
| PCB | 1 | | A080-91834-A000 |
| 74LS139 | 1 | U5B | U200-00049-0100 |
| 74LS245 | 1 | U5C | U200-00056-0100 |
| RAM NOV | 1 | U8C | U230-00007-0100 |
| ST 1002 SECURITY CHIP | 1 | U6B | U260-00050-010A |
| CAP CER. .1M 50V 20% | 23 | C1-C23 | U300-00009-0100 |
| CAP TANT. 2.2MF 10V 20% | 2 | C24,C25 | U310-00013-0100 |
| SOCKET 28 PIN | 12 | U1A-U8A,U1C-U4C | 110E-00001-0010 |
| SOCKET 20 PIN | 1 | U7C | U510-00017-0100 |
| SOCKET 40 PIN | 1 | U6B | 110E-00001-0011 |
| CONNECTOR AMP 2-102584-0 | 1 | P1 | U550-00064-0100 |




REV: Revisions due to type errors on 1/17/86.

M051-00114-A144

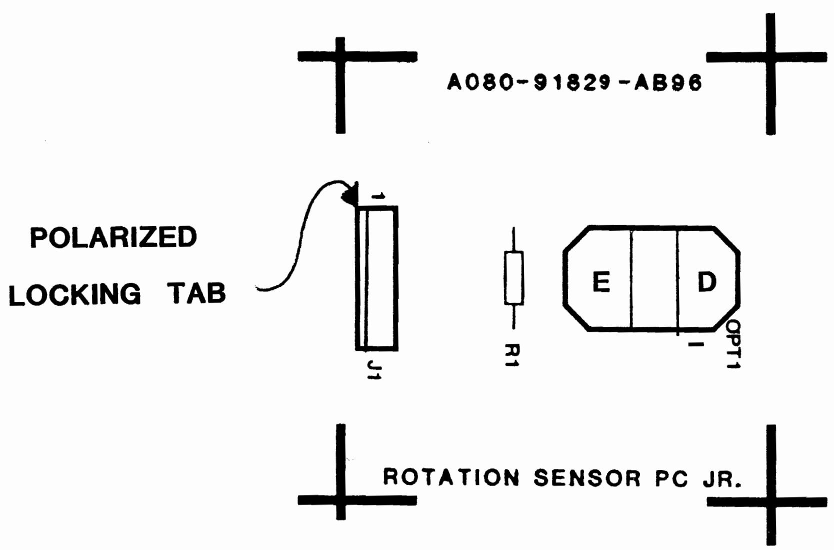
M051-00B96-A010 **Rev. A** **9/3/86**
ROTATION SENSOR P.C. JR.
A084-91829-AB96

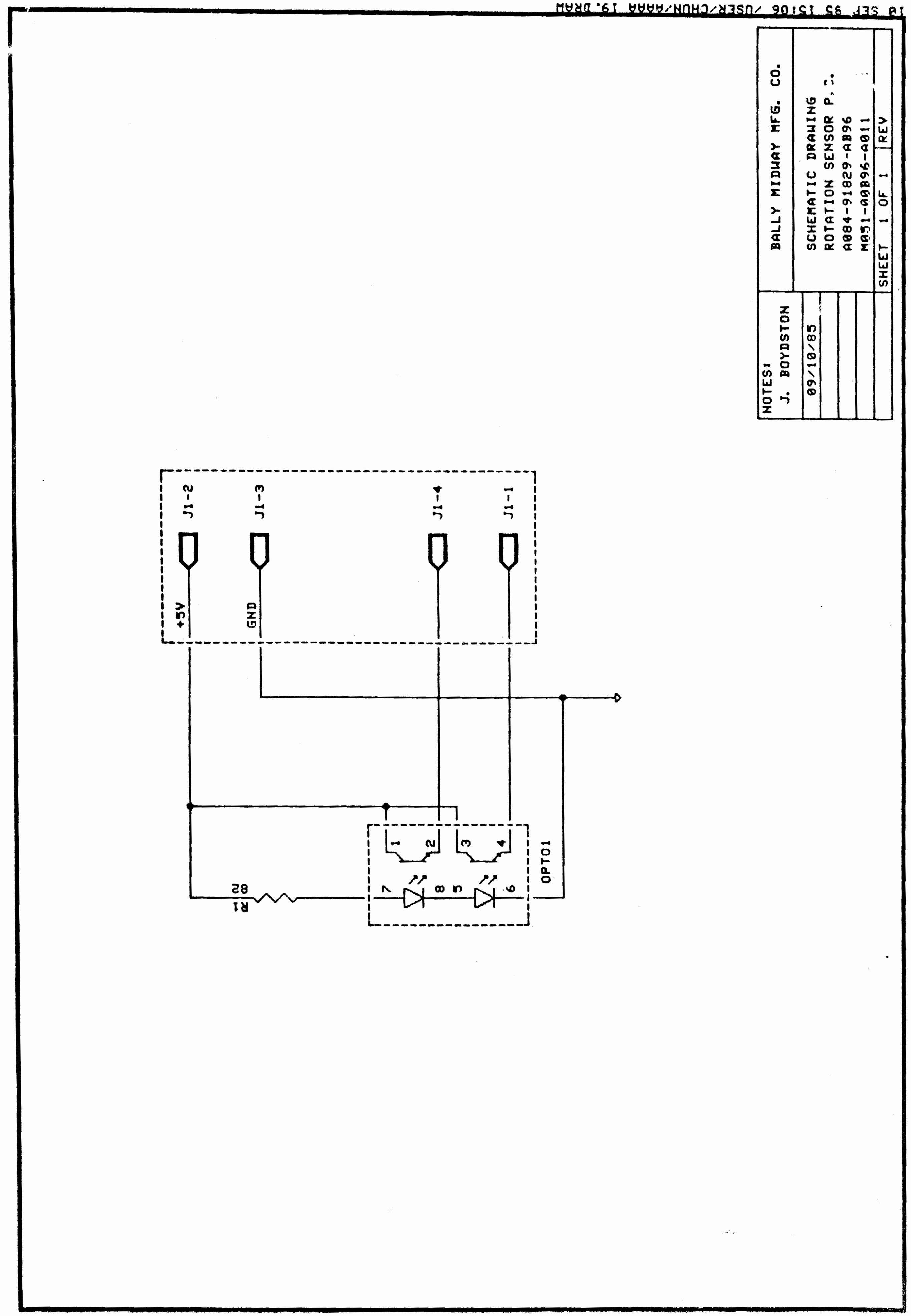
## DESIGNATION LIST

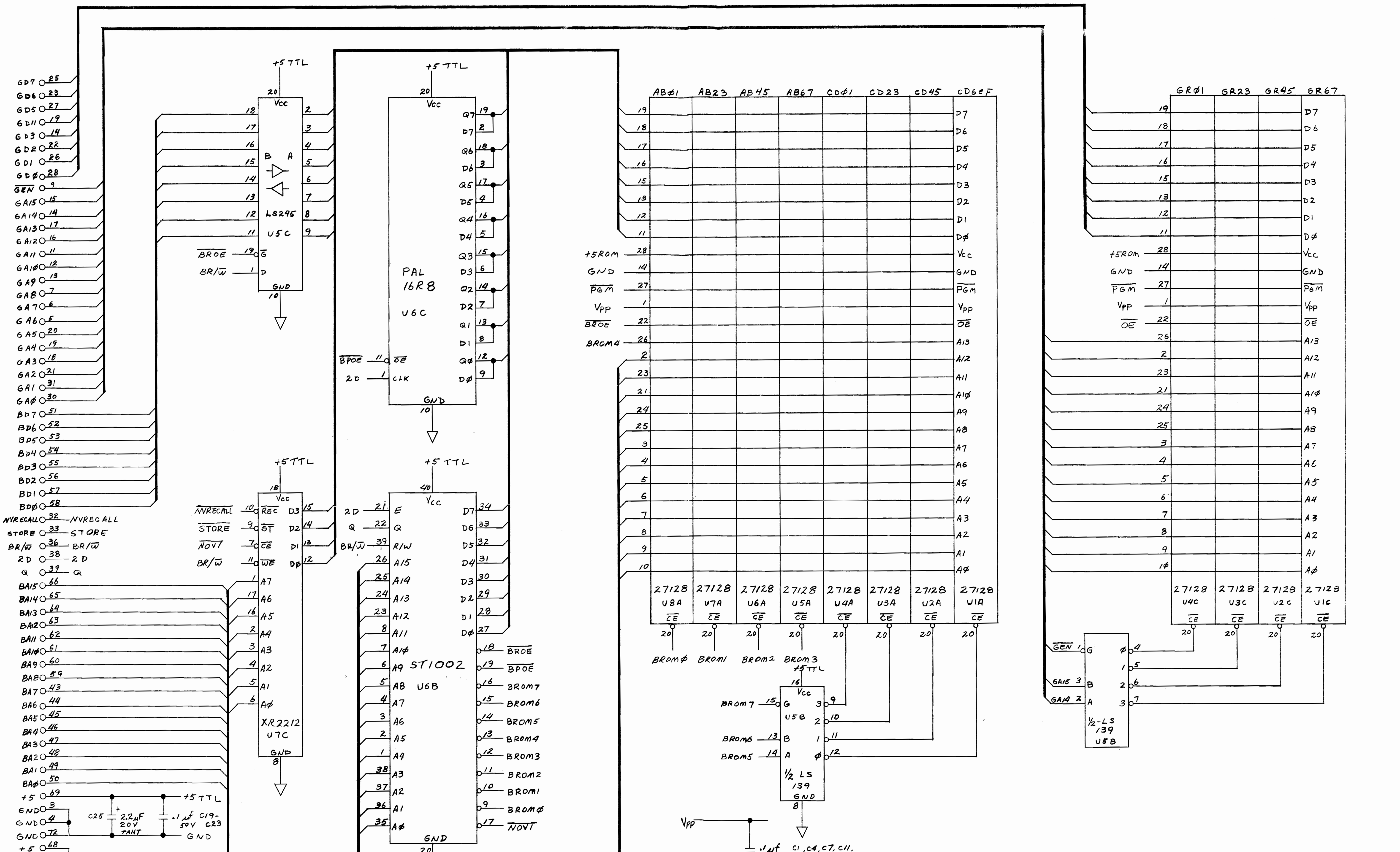
| DESIGNATION | DESCRIPTION |
|---|---|
| R1 | 82 OHM |
| OPTO 1 | OPTO SWITCH DUAL |
| J1 | 4 PIN HEADER ASSY. |
| PCB | ROTATION SENSOR PCB |

## CROSS REFERENCE

| DESCRIPTION | QTY. | DESIGNATION | PART NUMBER |
|---|---|---|---|
| 82 OHM | 1 | R1 | 100E-00005-0031 |
| OPTO SWITCH DUAL | 1 | OPTO 1 | **0E74-00804-0001** |
| 4 PIN HEADER ASSY. | 1 | J1 | 0017-00021-1264 |
| ROTATION SENSOR PCB | 1 | **PCB** | A080-91829-AB96 |






008-8027-01-0A REV A

A082-91334-A000

**DIM. TOLERANCES**
UNLESS OTHERWISE SPEC.
CONCENTRICITY T.I.R. . 002
FRACTIONAL ...... ± .1/64
DECIMAL .......... ± .005
HOLE DIA. ..... + .002 — .000
ANGLE ............ ± 1/2°
**DO NOT SCALE DWG.**

FIRST USED ON
DRN C.L
DATE 04/02/86
SCALE
MECH CHK.
MAT'L.
ELEC CHK.
FINISH

Bally SENTE
1280 Arnwood Ave. Sunnyvale, CA 94089

SCHEMATIC DRAWING
CARTRIDGE,
128 K, SECURE

REVISIONS

PART NO.
M0.5.1-0.0.1.1.4-A.1.4.5